

OPERATION MANUAL



Vibratory Trench Roller P33/24 HHMR SERIAL NO. 1536704 AND ABOVE

Revision #0 (04/25/07)

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THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.



WARNING



CALIFORNIA — Proposition 65 Warning

Engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

Practically-oriented development and design and many years of experience in the construction of vibratory trench rollers are your guarantee of a machine complying with the highest standard of quality and reliability. This operating and maintenance manual encompasses:

- Safety regulations
- Description of the machine
- Operating instructions
- Maintenance instructions
- Troubleshooting table

Use of this operating manual will

- Simplify the process of familiarisation with your machine.
- Prevent malfunctions due to operating errors.

Observance of the maintenance instructions will

- Increase reliability in on-site operation,
- Enhance the service life of the machine,
- Reduce repair costs and downtimes.

Foreword:

On transfer of the machine, please complete:

Machine model (Fig. 3)

Serial number (Fig. 1)

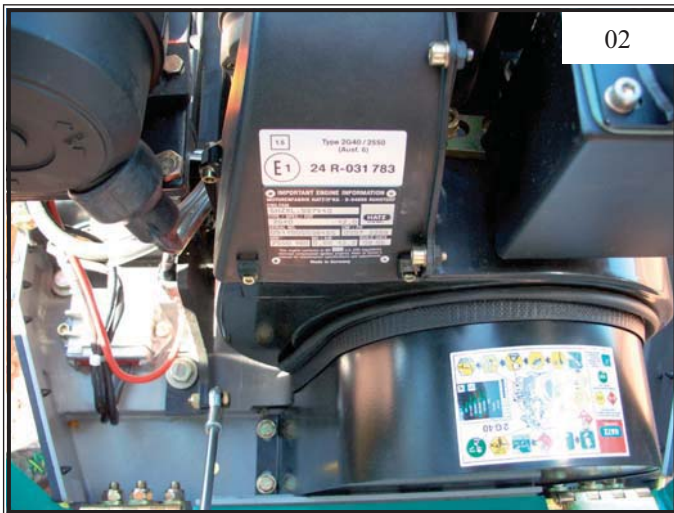
Engine type

Engine number (Fig. 2)



Attention:

On machine acceptance, you will receive instruction in the operation and maintenance of the machine by one of our staff or by an authorised dealer. It is vital that you pay particular attention to the instructions relating to safety aspects and hazards which can arise at the machine.



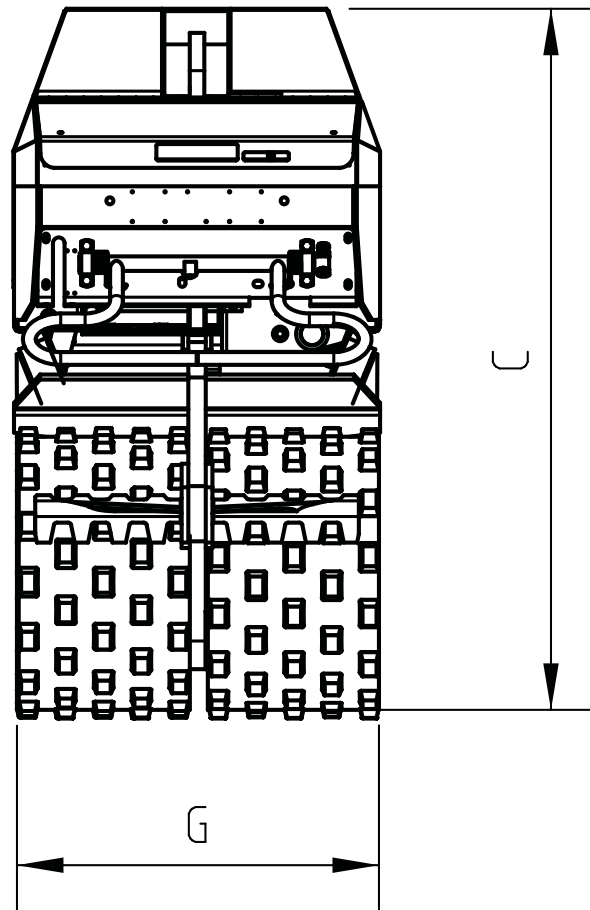
RAMMAX		03
company of the Ammann Group		CE
72555 Metzingen		
Tel.07123/92230 - Fax07123/922350		
Typ/Gewicht	<input type="text"/>	kg
Masch.Nr./Leistung	<input type="text"/>	kW
Baujahr	<input type="text"/>	Made in Germany

Note:

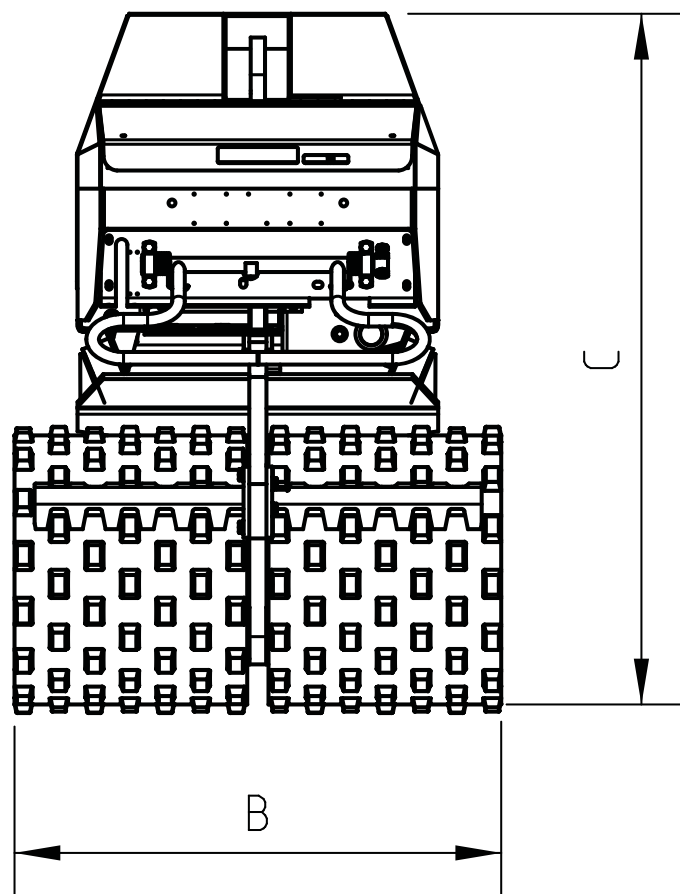
In the event that the engine number on the sticker is no longer legible due to soiling or damage, this number can also be found on the engine block. The location of the embossed engine number on the engine block can be seen from the Hatz operating and maintenance instructions.

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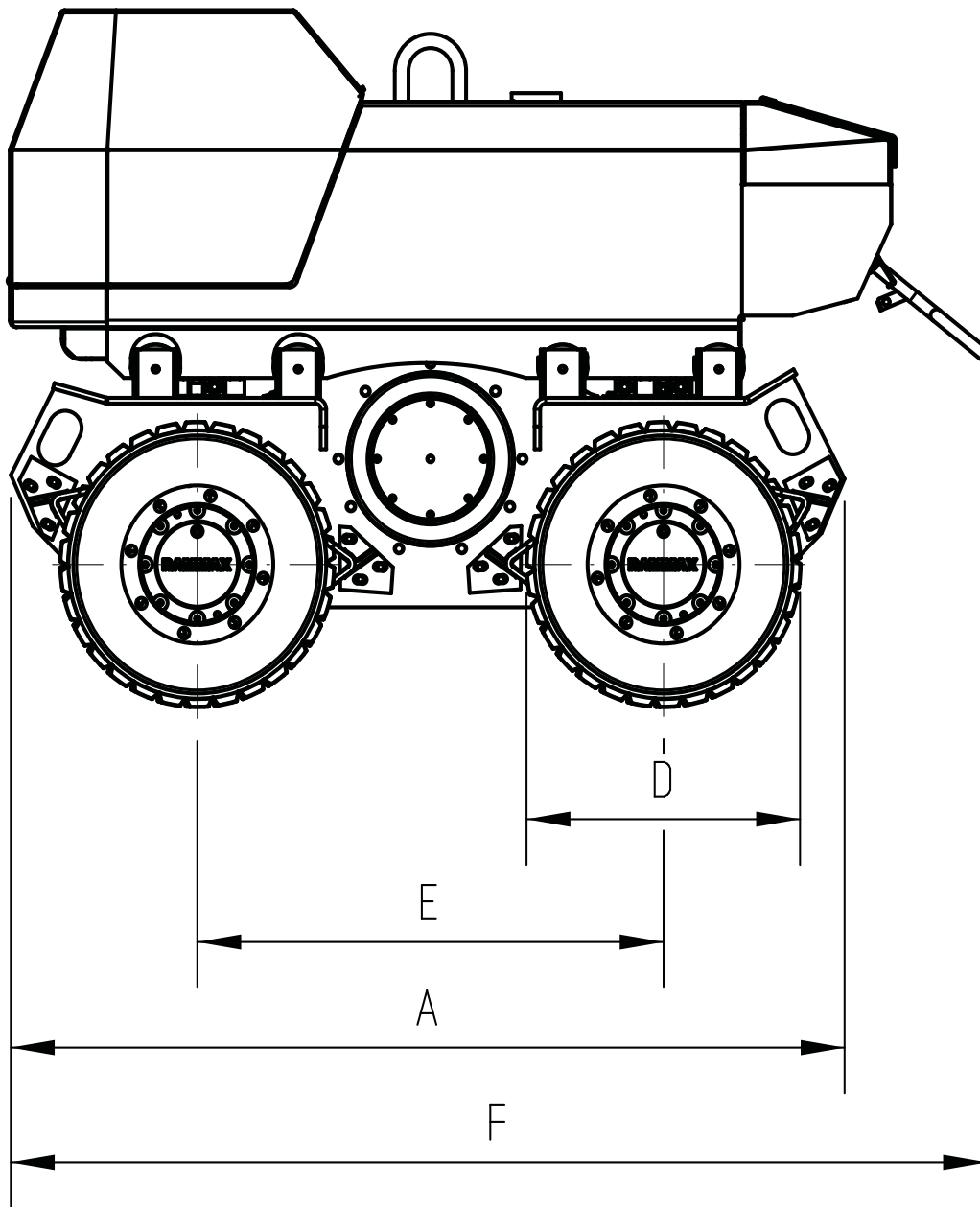
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B:	850	mm
C:	1200	mm
G:	630	mm



Specifications:



A:	1520	mm
D:	500	mm
E:	855	mm
F:	1780	mm

1.1 Main dimensions

RW 1504 /HF/HK/FK/HFK			Drum width 850 mm	Drum width 630 mm
Working width:		mm	850	630
Overall width		mm	850	630
Overall length		mm	1770	1770
Overall height		mm	1200	1200
Distance between axles		mm	850	850
Drum diameter		mm	500	500
Weights:				
Intrinsic weight:		kg	1413	1341
Operational weight:		kg	1480	1408
Mean axle load:		kg	740	704
Drive system:				
Engine/Type:			Hatz 2G40	Hatz 2G40
Output:		kW/PS	13.2 / 18	13.2 / 18
At rpm:			2700	2700
No. of cylinders/cooling:			2 / air cooled	2 / air cooled
Battery:		V	12	12
		Ah	72	72
Drive mode:			hydrostatic	hydrostatic
Driven drums:			4	4
Vibration system:				
Centrifugal force:	Vibration forwards:	kN	82	82
	Vibration reverse:	kN		
Amplitude:	Vibration forwards:	mm	2,2	2,2
	Vibration reverse:	mm		
Frequency:	Vibration forwards:	Hz	30	30
	Vibration reverse:	Hz		
Drive mode:			hydrostatic	hydrostatic
Vibrating drums:			4	4
Brakes:				
Service brake:			hydrostatic	hydrostatic
Parking brake:			hydromechanical	hydromechanical

Specifications:

RW 1504 /HF/HK/FK/HFK		Drum width 850 mm	Drum width 630 mm
Steering:			
Steering mode:		lever steering	lever steering
Steering actuation:		hydrostatic	hydrostatic
Filling capacities:			
Fuel:	l	25	25
Hydraulic oil:	l	47	47
Transmission oil (per drive):	l	1.1	1.1
Driving characteristics:			
Speed (forwards/reverses):			
With vibration:	m/min	0-16	0-16
Without vibration:	m/min	0-16	0-16
High speed:	m/min	0-35	0-35
Maximum climbing ability:			
With vibration:	%	45	45
Without vibration:	%	55	55
Special equipment:			
Drums:	Standard profile	Cam height 15 mm	Cam height 15 mm
Drums:	Special profile	Cam height 18 mm	Cam height 18 mm

1.2 Noise and vibration specifications

The noise and vibration specifications listed below in accordance with the EC Machine Directive in the draft (93/68/EEC) were determined under operating conditions typical for the machinery in question with vibration over a specified travel surface (DIN 45635).

In operational application, deviating values may result depending on the prevailing operating conditions.

Noise specification

The noise emission specification stipulated in accordance with Annex 1, Section 1.7.4.f of the EC Machine Directive is as follows:

- **Sound pressure level at the operator position:** LpA = 86.9 dB(A)
- **Sound power level:** LWA = 102.7 dB(A)

These noise emission values were determined in accordance with ISO 6081 for the sound pressure level (LpA) and ISO 3744, DIN 45635, for the sound power level (LWA).

Vibration specification

The vibration specifications stipulated in accordance with Annex 1, Section 2.2 / 3.6.3. a of the EC Machine Directive are as follows:

Hand-arm vibration values

The weighted effective acceleration value, determined in accordance with ISO 8662 Part 1, DIN 45675, Part 9, is approx. 10.3 m/sec₂.

Technical modifications reserved

Rammax RW 1504

2.0 Description

Many years of experience in the development and design of vibratory trench rollers created the basis for the new development of the infrared-controlled model RW 1504-HF.

The enormous degree of operating convenience, which provides both for manual and infrared control, permits the user to make even more flexible use of the machine.

The hard-wearing, compact design offers a high degree of security even in the most difficult terrain. Using the remote control facility, it is possible to control, start and switch off the machine up to 15 metres away from the operator.

Steering, vibration and travel drive in the RW 1504-HF are performed hydrostatically. The machine is enormously maintenance friendly (with the exception of the diesel engine). There are no V-belts, toothed belts, lubricating nipples or clutches with shift facility. This modern vibratory trench roller features offers easy access to the servicing points at the diesel engine, one-handed operation and sound absorption, 8 strippers and an operating hourmeter.

2.1 Fields of application

The vibratory trench roller RW 1504-HF is designed especially for trench compaction work. The complete lateral clearance of the drums guarantees compaction right up to the trench wall even in extremely tight and narrow trenches. The fields of application for this modern vibratory roller include wet, clay soil of the type encountered in canal building, pipe-laying, road substructure work and backfill work.

The infrared control facility also permits passage through trench sheeting and bracing, and underneath cross struts. In case of hazardous site missions, it is possible for the operator to control the machine from a safe distance and thus avoid exposure to personal danger.

2.2 Modifications to the machine

For reasons of safety, users are prohibited from making their own modifications or conversions to the machine.

This machine must only be equipped using original spare parts designed for use with the machine and in compliance with the requirements of the manufacturer. The installation or utilisation of special equipment or special parts can impair driving safety.

The manufacturer will accept no liability for damage caused as a result of the use of non-original parts or special equipment.

RAMMAX

Safety regulations



3.1 Intended use

Vibratory trench roller RW 1504-HF is constructed in accordance with the state of the art and with accepted rules of operating safety. However, its use can still give rise to hazardous situations which constitute a danger to life and limb for the operator or for third parties or which can lead to impairment of the machine or damage to other property if:

- It is used in a manner other than its intended use
- It is modified or conversion work is carried out by unqualified persons
- The safety remarks are not observed
- It is not operated or maintained by suitably qualified personnel.

The RW 1504-HF must only be operated when in a technically flawless condition and in accordance with its intended use with sufficient awareness of safety aspects and potential hazards and in strict observance of the operating instructions. In particular malfunctions which could detract from the safety of the equipment must be remedied without delay.

When operating the roller, adherence to the valid accident prevention regulations and the generally accepted rules of safety, as well as country-specific regulations is assumed.

The point „Fields of application“ (Section 2.1) outlines the designated purpose for which the RW 1504-HF is exclusively intended. Any other or further reaching use is deemed to be not in accordance with its intended use. The manufacturer/supplier accepts no liability for any damage arising as a result of such incorrect use. All risk arising rests solely with the user.

3.2 Operation of the machine

Only suitably qualified and designated persons who have received the appropriate training, and who are over 18 may drive and operate the machine. Fields of responsibility during operation must be clearly defined and observed. All persons entrusted with operation, maintenance or repair of the machine must read and adhere to the safety regulations. Where appropriate, this must be confirmed by the user's company by means of a signature by the person or persons concerned.

Persons acting under the influence of drugs, medicines or alcohol may not operate, maintain or repair the machine.

Maintenance and repair require specialist knowledge and may only be carried out by qualified specialist personnel.

3.3 Safety remarks in the operating and maintenance instructions

Danger

This warning sign is an indication of possible danger of personal injury.

Note:

This warning sign is an indication of possible impairment to the machine or parts of the equipment.

Remark:

These parts of the instructions provide technical information intended to ensure optimum economy and efficient use of the machine.

3.4 Safety signs attached to the machine

Keep all safety plates and labels in good legible order and ensure their observance. Damaged and illegible safety plates and labels must be renewed without delay. All plates and labels can be re-ordered from the spare parts list.

3.5 Loading the machine for transport

- Only use stable loading ramps with sufficient load-bearing capacity. The ramp incline must not be any steeper than the specified climbing ability (see Specifications) of the machine.
- Safeguard the machine against tilting or slipping.
- Safeguard the machine on transport vehicles against rolling, slipping and tipping over.
- When raised, the machine must not be allowed to swing wildly.

The following situations represent a danger to life and limb:

- Walking or standing under suspended loads.
- Remaining within the driving area of the machine while it is being guided into position and loaded.

3.6 Starting the machine

3.6.1 Before starting

- The machine may only be operated from the operator's side (behind the machine).
- Familiarise yourself with the equipment, the operating and control elements and the functional characteristics of the machine.
- Use personal safety gear (safety helmet, safety shoes, ear protection etc.).

Before starting, check whether:

- There are persons or impediments located next to or under the machine
- The machine is free of oily and flammable materials
- All handles, steps and platforms are free of grease, oil, fuels, dirt, snow and ice
- The machine exhibits any obvious defects
- All protective gear is securely in place
- Brakes and operating elements are working

Never start the machine if any instruments, pilot lamps or control organs are defective. Do not tie any loose objects onto the machine.

3.6.2 Starting

For starting, all operating levers must be in the „Neutral position“. After starting, check all display and operating elements.

3.6.3 Jump starting with jump leads

Note:

The machine is equipped with a 12-Volt system!

Connect the plus to the plus terminal and the minus to the minus terminal (earth cable). Connect the earth cable last and disconnect first! Incorrect connection will result in serious damage to the machine's electrical system.

3.6.4 Starting in enclosed areas

Exhaust fumes are lethal!

When starting in closed rooms, therefore, always ensure sufficient ventilation.

3.7 Driving the machine

3.7.1 Persons in the hazard area

Each time before starting work, also after interruptions, check whether there are persons or obstacles positioned in the hazard area, particularly when reversing. If required, give a warning signal. Stop work immediately if persons fail to leave the hazard area despite warning.

3.7.2 Driving

- In emergency situations and in case of danger, stop the machine immediately. Only resume operation when the danger which caused the stop has been eliminated.
- The machine may not be used to transport persons.
- In case of unusual noises and generation of smoke, ascertain the cause and have the problem remedied.

3.7.3 Negotiating uphill and downhill slopes

- Do not drive up or down slopes steeper than the maximum climbing ability of the machine.
- On slopes, always drive directly upwards or downwards and proceed with caution. Before starting, select a lower gear.
- Damp and loose substrates substantially reduce the machine's grip on sloping surfaces and inclines. Increased risk of accidents!

3.7.4 Driving in traffic

- Adjust your speed to the working conditions.
- Always give way to loaded transport vehicles.
- Keep your distance from edges and embankments.

3.7.5 Checking the effects of vibration

During compaction work with vibration, check the effect on adjacent buildings and buried pipelines (gas, water, sewage, electrical). If necessary, compaction work may have to be discontinued.

Never use vibration on hard substrates (concrete or frozen earth), as this will damage the bearings!

3.7.6 Parking the machine

Wherever possible, park the machine on a firm, even surface.

Before leaving the machine:

- Switch off the engine and pull out the ignition key.
- Parked machines which could represent an obstruction must be safeguarded by clearly identifiable measures.

3.7.7 Parking on uphill and downhill slopes

Safeguard the machine against rolling away. To do this use metal chocks in front of and behind the drums.

3.8 Refuelling

- Never breathe in fuel fumes.
- Only refuel when the engine is switched off.
- Never refuel in enclosed areas.
- No naked flames, no smoking.
- Do not spill fuel, mop up any splashes of fuel, do not allow to seep into the ground.

3.9 Maintenance work

- Maintenance work may only be performed by suitably qualified and trained personnel.
- Keep unauthorised persons away from the machine.
- Never carry out maintenance work on a moving machine or with the engine running.
- Wherever possible, park the machine on a firm and even surface.
- Remove the key from the ignition switch.

3.9.1 Work on hydraulic lines

Before performing any work on hydraulic systems, they must be depressurised. Hydraulic oil emerging under pressure can penetrate the skin and cause serious injury. In case of injury due to oil emerging at high pressure, immediately consult a doctor as serious infections can result. When performing adjustment work on the hydraulic system, do not stand in front of or behind the drums. Do not adjust the pressure relief valves.

Drain off the hydraulic oil at operating temperature – danger of scalding! Collect drained hydraulic oil and dispose of in an environmentally responsible manner. Never attempt to start the engine when the hydraulic oil has been drained. After the completion of all work (with the system still depressurised!), check the seal of all connections and screw joints.

3.9.2 Changing hydraulic hoses

Hose lines must never be swapped or exchanged. Subject hydraulic hose lines to regular visual inspections. The immediate exchange of hydraulic hose lines is essential in the following cases:

- Damage of the outer ply through to the inlay (e.g. abrasion, cuts).
- Brittleness of the outer ply (crack formation in the hose material).
- Deformation in pressureless or pressurised condition which does not correspond with the original shape of the hydraulic hose line.
- Deformation on bending, e.g. crushing points, kinks, separation of plies, formation of blisters.
- Incorrectly executed installation.
- Migration of the hydraulic hose from the fitting.
- Corrosion of the fitting which impairs functional characteristics and strength.
- Damage or deformation of the fitting which impairs functional characteristics, strength or the hose to hose connection.

Only original RAMMAX spare hydraulic hose lines offer the security of using the correct hose type (pressure stage) in the right situation.

3.9.3 Work on the engine

Drain the engine oil at operating temperature – Danger of scalding!

Wipe away any spilt oil, collect drained oil and dispose of in an environmentally responsible manner. Keep used filters and other oil-soiled materials in a separate, specially marked container and dispose of in an environmentally responsible manner.

3.9.4 Work on parts of the electrical system

- Before performing work on the electrical system, disconnect the battery and cover with isolating material.
- Do not use fuses with a higher amperage or repair fuses. Fire hazard!

3.9.5 Work on the battery

- When carrying out work at the battery, never smoke or expose to a naked flame.
- Do not allow acid to contact hands or clothing. In case of injury due to acid spillage, rinse with clear water and consult a doctor.
- Never place any tools on the battery.
- Dispose of old batteries in compliance with regulations.

3.9.6 Work on the fuel system

- No naked flames, no smoking, do not spill fuel.
- Collect emerging fuel, do not allow to seep into the ground and dispose of in an environmentally friendly manner.

3.9.7 Cleaning work

- Never carry out cleaning work with the engine running.
- Never use petrol or other easily flammable materials for cleaning.
- When cleaning using a steam jet cleaning device, cover all electrical parts and the insulating material or do not expose to direct water or steam jet.
- Do not direct the cleaning jet into the silencer.

3.9.8 After completing maintenance work

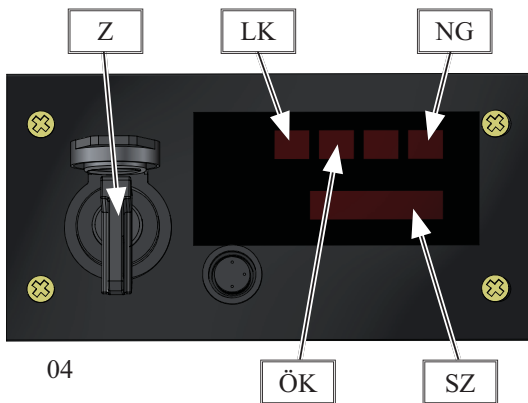
- All protective devices must be replaced after cleaning and maintenance work.
- Carry out function checks.

3.10 Repairs

If the machine is defective, hang a warning sign on the machine. Repairs may only be performed by qualified and specially commissioned personnel.

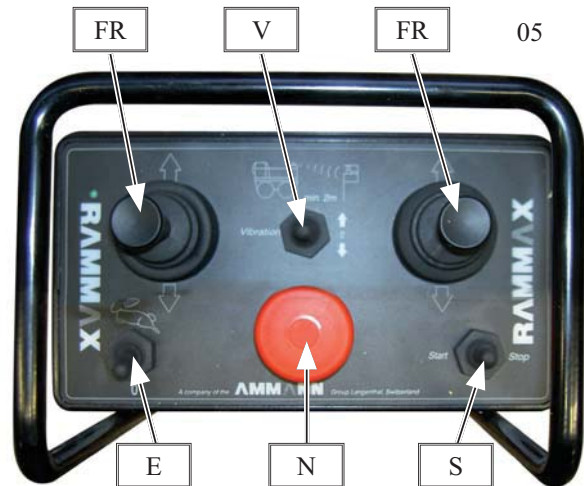
4.0 Display and operating elements

Cockpit:

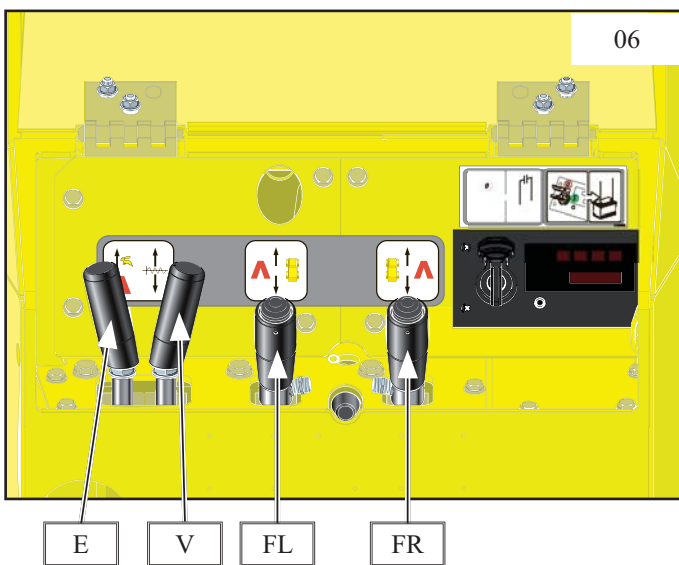


Z:	Ignition lock
LK:	Battery charge indicator light
NG:	Inclination indicator
ÖK:	Oil pressure warning light
SZ:	Hourmeter

Transmitter:



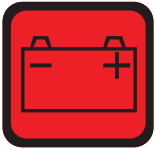
FL:	Travel, left
FR:	Travel, right
V:	Vibration
E:	High speed
S:	Start/stop
N:	Emergency stop



GH:	Throttle lever
-----	----------------

4.1 Description of the display and operating elements

LK: Battery charge indicator light



- Lights up:
- When the ignition is switched on
 - In case of charging faults in operation, ascertain cause

- Goes out:
- After starting the engine.

ÖK: Oil pressure warning light



- Lights up:
- When the ignition is switched on
 - In the event of a drop in oil pressure in operation.

- Goes out:
- After starting the engine.

NG: Inclination indicator



- Lights up:
- When the ignition is switched on
 - In the event of a drop in oil pressure in operation.

- Goes out:
- After starting the engine.

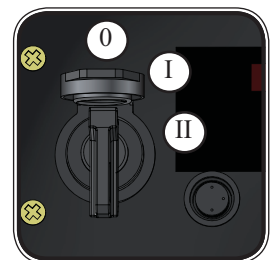
GH: Throttle lever

- Position „0“:
- Switches off the engine
- Position „I“:
- Starts the engine
 - Operating position for vibration



Z: Ignition switch

- Position „0“:
- Inserting and removing the key.
- Position „I“:
- Ignition on, battery charge indicator light „LK“ and oil pressure warning light „ÖK“ light up.
- Position „II“:
- Turn the ignition key further against spring pressure towards position II
Engine starts up. After engine start, release key, pilot lamps go out.



Remark:

The ignition switch has a start repeat disable function. To restart the engine, first turn the key to the „0“ position. Continue to start without interruption for max. 15 to 20 seconds, with pauses of approx. one minute between. If the engine fails to start within this time, ascertain the cause of the fault and remedy. The engine can only be started with the throttle lever in the middle position.

SZ: Hourmeter

The hourmeter counts the number of operation hours with the ignition switched on. The maintenance work must be carried out according to the displayed operating hours.



FR: Travel lever for drums, right

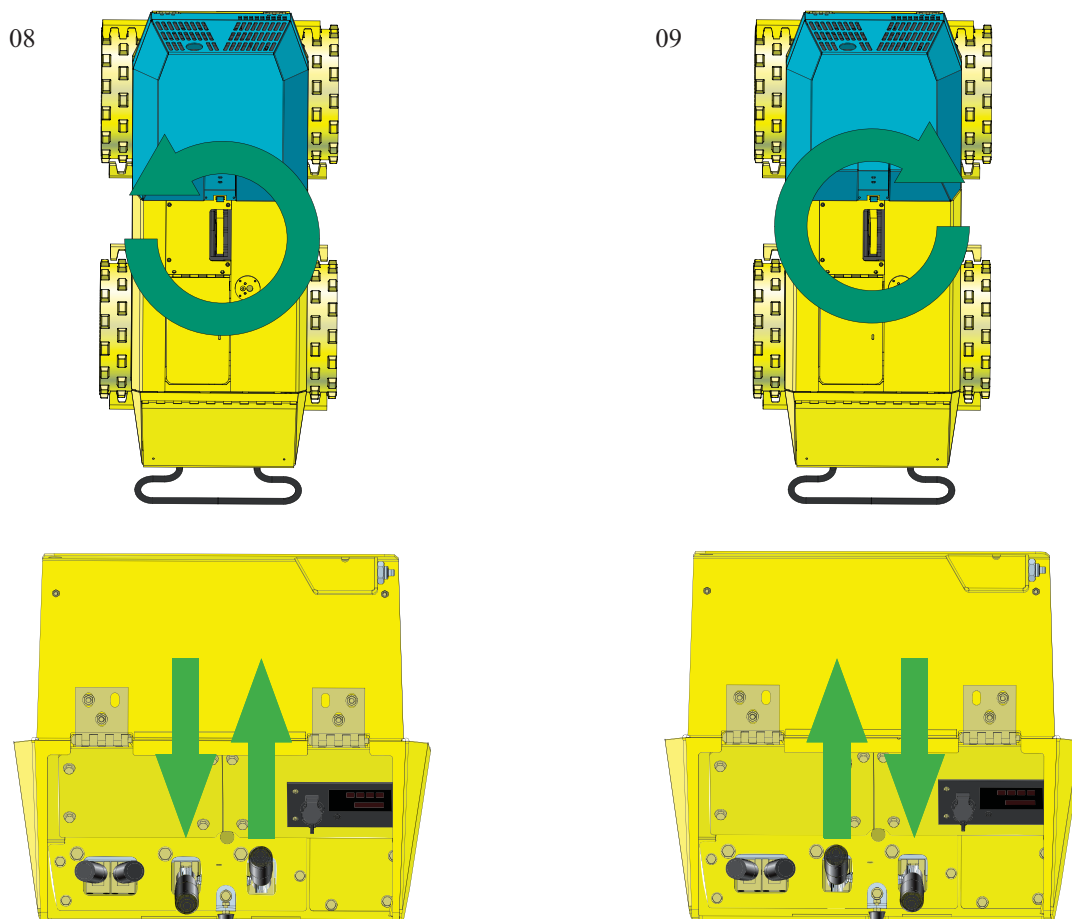
- Position „0“ = Zero position for engine start
- Position „Front“ = Forward travel!
- Position „Back“ = Reverse travel!

FL: Travel lever for drums, left

- Position „0“ = Zero position for engine start
- Position „Front“ = Forward travel!
- Position „Back“ = Reverse travel!

Remark:

The position of the two travel levers FR and FL relative to one another determines the direction of travel: straight on, left-hand curve, right-hand curve or turning around the vertical axis (rotating on the spot, see diagram).



4.2 Back-up safety bar

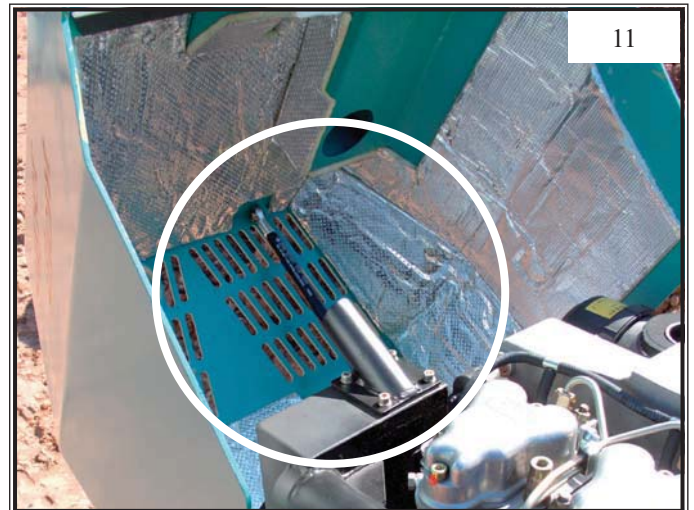
- Forward travel: No function!
- Reverse travel: If the back-up safety bar is actuated, the machine automatically comes to an immediate stop.
- Moving clear: Move Both travel levers „FR“ and „FL“ to the „front“ position, the machine travels away from the obstacle!

4.3 Engine safety support

Used for filling the fuel tank or when the engine hood is opened to carry out repairs. The hood is safeguarded against dropping by the gas pressure spring.

Danger

The engine hood falling down can lead to serious injury!
The gas compression spring must not be removed and must always be replaced in order to exclude the danger of injury..

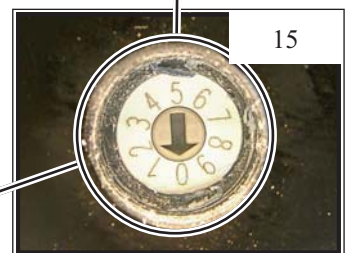
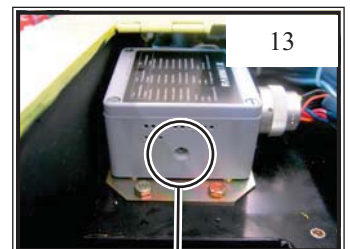


4.4 Address setting

- Open cover D.
- Loosen plug „S-A“ on the transmitter and receiver. (Fig. 13-15)
- Using a screwdriver, it is then possible to set up to four addresses.

Note:

- The addresses at the transmitter and receiver must correspond.
- Example: 0 - 0/9 - 9 etc.



5.0 Operation with remote control

5.1 Precommissioning checks

Before putting the machine into service every day or before a long work period, the following checks must be performed.

⚠ Danger

Observe the safety remarks in section 3.0 of this operating and maintenance manual.

- Place the machine on an even, load-bearing surface.
Check:
- All screw joints
- Function of the travel levers
- Function of the back-up safety bar
- The machine for any damage
- The emergency stop switch of the transmitter

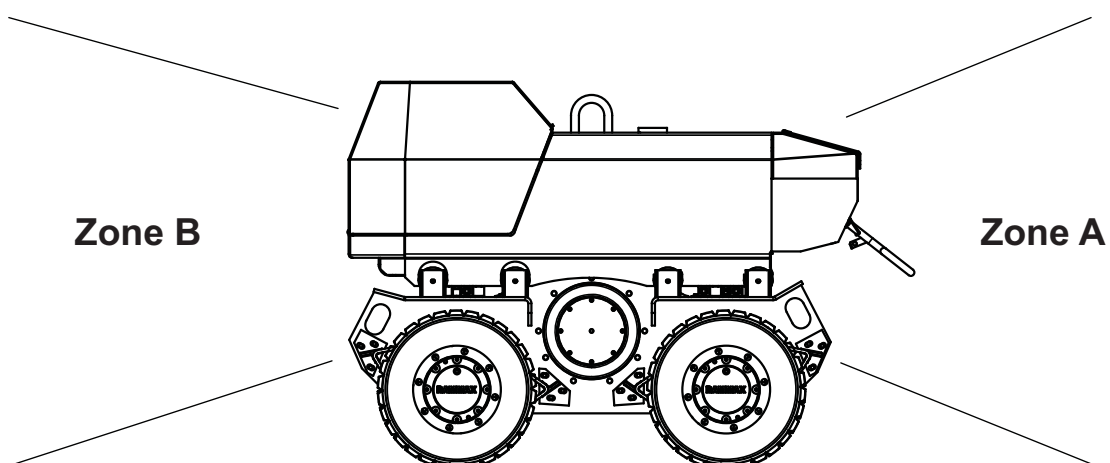
Remark:

The following checks are described in the section „9.0 Maintenance“!

- Engine oil level
- Hydraulic oil level
- Fuel level

5.2 Operation

When operating the machine with remote control, the correct position is behind the roller. Zone „A“. If the operator is standing on the other side - Zone „B“ - the actuating directions of the control elements do not correspond to those of the roller.



When operating the machine with the remote control, the minimum distance from the machine must be 2 metres, as under some operating conditions reflections occur which can cause errors in the close range stop function.

Operation:

Note:

- Desist from any method of operation which could pose a safety hazard or impair the static stability of the machine.
- Never travel on sloping surfaces transversely, but always directly upwards or downwards.
- Every time before starting up, always clean the transmitter and receiver elements.
- For safety reasons, never deposit the transmitter near the machine. During breaks in work, the emergency stop switch must always be activated (Position „0“).

Should the transmitter be defective for any reason, switch off the machine immediately using the throttle lever „GH“.

⚠ Danger

Before driving, check whether persons are located in the driving area. Damp and loose substrates substantially reduce the machine's grip on sloping surface and inclines. When driving up slopes and inclines, the speed must be adjusted in line with the terrain. Never drive at high speed on slopes and inclines.

Remark:

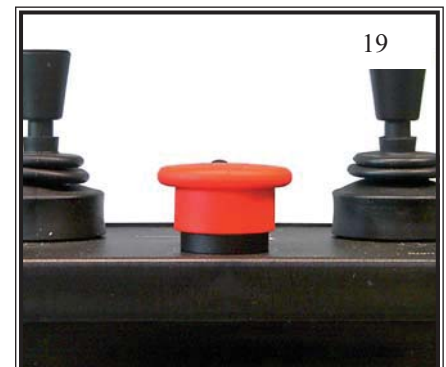
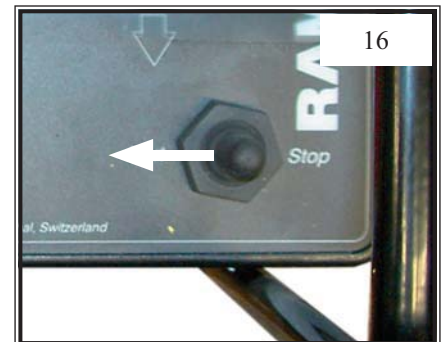
The transmitter is fitted with solar cells:

- Steps must be taken to guarantee that the solar cells are not covered during and after operation, in order to guarantee automatic charging..
- The solar cells must also be cleared of dirt, as otherwise automatic charging cannot be guaranteed.

5.3 Starting the engine

When starting the engine, the starting conditions of the engine manufacturer must be observed.

1. Fill with fuel (see Maintenance section 9.6)
2. Move the throttle lever to the „Start“ position (Fig. 17).
3. All switching levers must be in the neutral position (Fig. 18).
4. Slip on the transmitter, move the emergency stop switch from the „N“ to the „I“ position (Fig. 19).
5. Press the Start/Stop switch „S“ (Fig. 16) to the left and hold until the engine starts.



Remark:

- Do not actuate the start switch for longer than 15 secs. If the engine fails to start repeat the process.
- For starting with jump leads, see section 7.0, page 28.

Note:

- The minimum distance between the transmitter (operator) and the receiver (machine) is 2 metres. If the minimum distance is not adhered to, the safety close-range function is activated, i.e. the machine cannot be started.
- If the minimum distance is not adhered to during operation, the engine continues to run but the machine comes to a standstill. In both cases, increase the distance and repeat the process.
- If several machines are in use at the same location, the addresses must be coordinated.

⚠ Danger

Switching errors or malfunctions can be caused as a result of identical frequencies!!!

5.4 Switching on and reversing the direction of travel

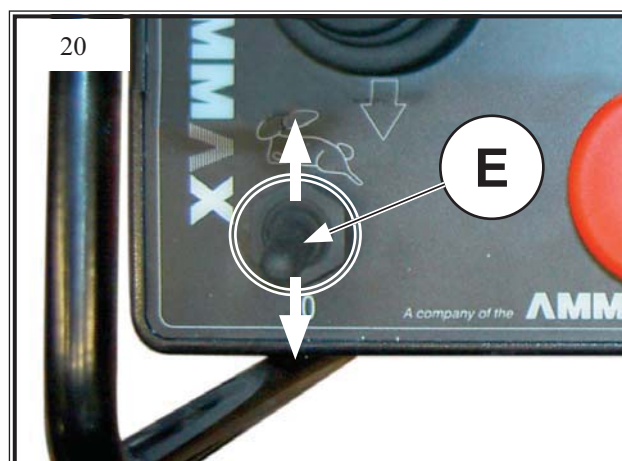
- Travel levers „FL“ and „FR“ in „front“ position: Machine travels forwards.
- Travel levers „FL“ and „FR“ in „back“ position: Machine travels backwards.
- If the travel levers are moved in opposite directions, the machine travels around its vertical axis (on the spot).
- The machine comes to a stop when the travel levers are not actuated.

5.5 Driving at high speed

- Driving at high speed is only possible if the switching lever „E“ is pushed forwards. (Fig. 20)
- Operate both travel levers „FL“ and „FR“ as for normal operation.

Note:

The roller travels at twice the speed in the „high speed“ mode.



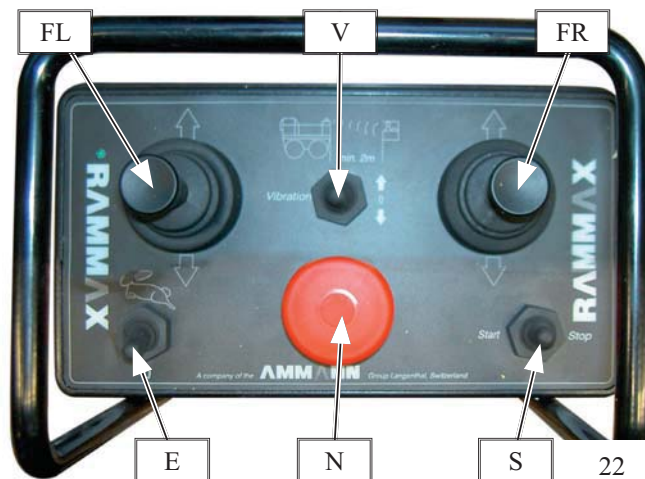
5.6 Driving with vibration

- Vibration is switched on when the switching lever „V“ is pressed forwards or back (Fig. 21).
- If the switching lever is pushed forwards, the vibration runs „forwards“, if the lever is pushed back, it runs „in reverse“.
- In even terrain, the switch position is of no consequence.
- However, if the machine has to negotiate an incline, the vibration be switched to the direction of travel in order to increase the machine's climbing ability.



5.7 Switching off the machine

1. Move the switches „FL“, „FR“, „V“ and „E“ to their central position / switch off (Fig. 22).
2. Press the Start/Stop switch „S“ to the right and hold there until the engine comes to a complete standstill.
3. Actuate the emergency stop switch „N“ by pressing down. (Fig. 22)



Note:

After switching off the machine, the ignition key must be removed.

6.0 Manual control

Note:

All safety conditions from Section 5.0 Operation with remote control must be observed when working with manual control!

6.1 Starting process

When starting the engine, the starting conditions of the engine manufacturer must be observed.

1. Fill with fuel (see Maintenance section 9.06)
2. Move the throttle lever to position „I“ (Fig. 17).
3. All switching levers must be in the neutral position (Fig. 18).
4. Turn the ignition switch to the position „I“ (Fig. 24). Oil pressure warning light „ÖK“ and battery charge indicator light „LK“ light up.

6.2 Travel operation

Push both travel levers „SL“ and „SR“ to the front.

The machine begins to travel forwards. For reverse travel, pull both travel levers backwards. To steer to the side, the travel levers are moved in the opposite directions (turning on the spot).

6.3 High speed

Push the switch lever „SE“ forwards. The functional is the same as for the work mode..

Note:

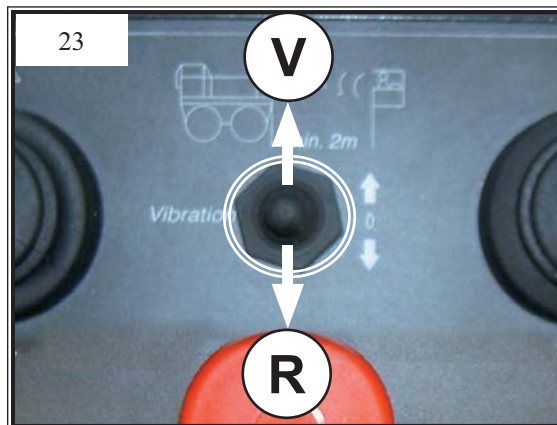
The machine travels twice as fast in „high speed“ mode as in the working mode!

6.4 Vibration

When travelling with vibration, in addition to travel levers „SL“ and „SR“, the switching lever „SV“ is actuated (Fig. 23). In the central position, vibration is switched off, in position „V“ forwards or „R“ reverse.

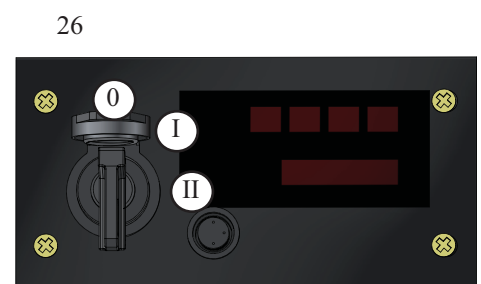
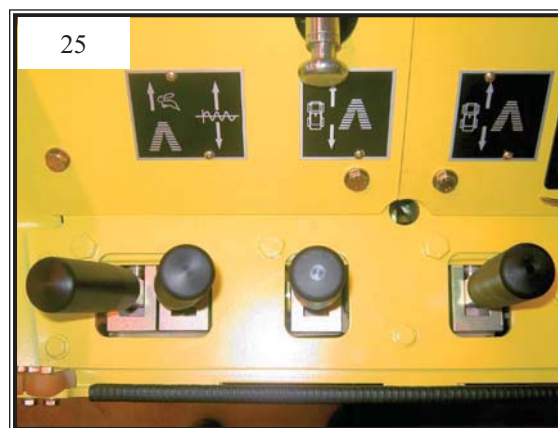
Remark:

When working on even terrain, the switch position of the vibration lever „V“, or „R“, is not important. However, if the machine has to negotiate an incline, the vibration switching lever must be switched to the direction of travel in order to increase the machine's climbing ability.



6.5 Switching off the machine

1. Move the switches „FL“, „FR“, „V“ and „E“ to their middle / off position (Fig. 25).
2. Move the throttle lever „GH“ to position „0“ (Fig. 24).
3. Turn the ignition switch to position „0“ (Fig. 26).



Note:

After switching off the machine, the ignition key must be removed.

7.0 Jump start device (FSE)

Note:

12 V system!!!

1. Connect the jump start battery to the „+“ terminal and the „+“ terminal of the FSE to the machine.
2. Connect the jump start battery to the „-“ terminal and the „-“ terminal of the FSE to the machine.
3. Start the machine (page 26, section 6.1) Start procedure
4. Disconnect the battery again in the reverse order.

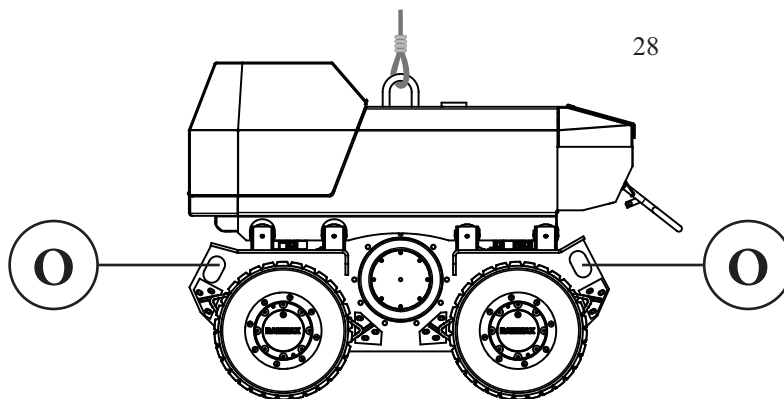
Remark:

In order to avoid danger when connecting and disconnecting the battery, connect the „+“ terminal first and disconnect it last. The „-“ terminal should never be connected alone.



8.0 Loading and transport

- To load the roller using hoisting gear, there is a central transport eye bolt „B“ in the middle of the roller (Fig. 28).
- The roller can also be loaded independently by being driven up a suitable loading ramp.



Note:

- Only loading ramps with sufficient loading capacity and static stability must be used which exclude any possibility of personal injury.
- To lash the roller, always use shackles which are fastened to the transportation eye bolts „O“ (at the front and back of the central web).
- The roller must be lashed in such a way that it is secured against tipping over, slipping or rolling away.
- Do not walk or stand under suspended loads.

9.0 Maintenance

9.01 General remarks on maintenance and maintenance work

Steps must be taken to ensure that all safety regulations are adhered to in the execution of maintenance work!

Careful machine maintenance guarantees far greater functional reliability and increases the life of all important components. The necessary input is minimal in relation to the faults and problems which can occur as a result of failure to perform maintenance work.

- The engine and machine must be thoroughly cleaned before performing any maintenance work.
- Maintenance work may only be performed when the engine is at a standstill.
- When working with the hydraulic system, this must first be depressurised.
- Before working on the electrical system, detach the battery, cover it and protect with insulating material.
- Check the electrical equipment of the machine at regular intervals. Defects such as loose connections or melted cables must be remedied immediately and replaced by new ones.
- Only carry out maintenance and repair work when the machine is positioned on an even surface capable of bearing loads and safeguarded against rolling away.
- Adhere to the prescribed maintenance and inspection procedures in the operating instructions, including instructions in the exchange of parts. This work may only be performed by specialised personnel.
- Oil and fuels must not be permitted to seep into the ground or sewage system during maintenance work. These must be collected using suitable means and disposed of in an environmentally responsible manner!

Remarks on the hydraulic system:

Avoid dirt or other contaminants entering the hydraulic system. Even the smallest dirt particles in the hydraulic pipework can lead to tremendous impairment to hydraulic units and so to costly repairs.

- Should it be discovered during the daily check of the hydraulic oil level that the oil level is sinking, the complete hydraulic pipework must be checked immediately for leaks.
- Leaks must be repaired immediately. If necessary, inform the responsible after-sales service.
- If possible fill the hydraulic system with filling aggregate.
- Clean screw joints, the filling cap and its surroundings before removal to prevent the ingress of dirt particles.
- Do not leave the tank cap open unnecessarily to prevent foreign bodies entering the system.

9.02 Running in regulations

Maintenance after 25 hours of operation:

- Check all screw connections and tighten if necessary.
- Check hydraulic hoses and the complete hydraulic oil system for leaks.
- Replace the fuel filter. (Fig. 18, section 9.7)
- Engine : See maintenance instructions Hatz 2G40!

9.03 Maintenance schedule

No.:	Description:	Remarks:	Page:
Every day			
8.6	• Check engine oil level	• Observe gauge marking	35
8.7	• Check hydraulic oil level	• Oil sight glass	35
	• Check hydraulic filter element		
8.8	• Check fuel level	• Sight glass	36
8.12	• Check air filter		38
	• Diesel engine, see Hatz 2G40 operating manual	(Annex)	
After 25 hours of operation			
	• Check all bolts and screws for tightness	Tightening torques	
8.9	• Replace fuel filter		36
	• Diesel engine, see Hatz 2G40 operating manual	(Annex)	
	• Replace high-pressure filter element		
After 75 hours of operation			
8.15	• Replace air filter cartridge (earlier, if necessary)		40
8.10	• Service the battery	Grease the terminals	37
	• Note: Diesel engine oil (see Hatz 2G40 operating manual)	(see Annex)	
Every 100 operating hours			
8.12	• Clean or replace air filter cartridge	(earlier, if necessary)	38
9.0	• Service the battery		43
Every 250 operating hours			
	• Check the oil level in the travel drives		
8.11	• Check all bolts and screws for tightness	Tightening torques	41
8.9	• Drain water from diesel line filter or replace filter		36
8.9	• Inspect all diesel lines for leaks		36
Every 500 operating hours			
8.15	• Diesel engine, see Hatz 2G40 operating manual	(see Annex)	40
	• Change the transmission oil in the travel drives	(at least every 6 months)	
	• Replace high-pressure filter element	(2nd service)	
Every 1000 operating hours			
8.14.2	• Change the hydraulic oil	(at least 1x per year)	40
	• Replace high-pressure filter element		
8.9	• Replace fuel filter	(after the 3rd service, at least 1x per year)	36
8.15	• Replace suction filter		40
As required			
8.16	• Adjust stripper		41
8.11	• Check all bolts and screws for tightness	Tightening torques	41
	• Engine conservation	see Hatz 2G40 operating manual (Annex)	

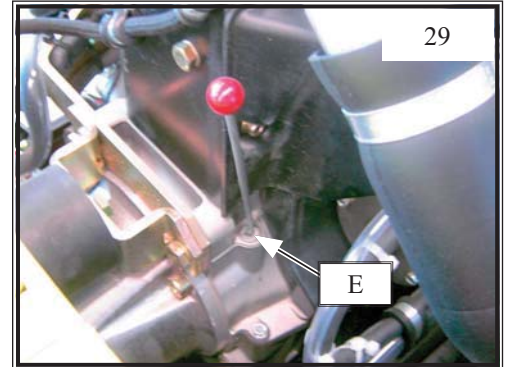
9.04 Check engine oil level

Remark:

Park the machine on an even, load-bearing surface in such a way that it is horizontal.

- Pull out the oil dip stick „MS“ and wipe off with a lint-free cloth (Fig. 29).
- Insert the oil dip stick as far as it will go and pull out again.
- The oil level must be between the two marks.
- If the oil level is below the bottom mark, top up with oil immediately.

For suitable oil types, see the Hatz 2G40 manual!



9.05 Checking the hydraulic oil level

Remark:

Park the machine on an even, load-bearing surface in such a way that it is horizontal.

- Check the hydraulic oil level at the oil sight glass under the engine hood.
- Only check the oil level when the engine is cold. The hydraulic oil should come up to the middle of the sight glass.
- If necessary, top up with hydraulic oil.

Recommended oil types: Mobil HPL 46, Texaco Rando HD-C. Equivalent oil types from other manufacturers can be used.

Remark:

If it is discovered during the daily oil level check that there is hydraulic oil missing, Check all units, pipelines and hoses immediately for leaks.

9.06 Checking the fuel level

⚠ Danger

Danger of fire!

When working with the fuel system, no naked flames, no smoking. Do not refuel in enclosed areas. Do not breathe in fuel fumes.

Note:

Contaminated fuel can lead to the failure of or damage to the engine. If necessary, top up fuel through a sieve filter. Clean the area surrounding the filling hole and refuel. Fuel: See the Hatz 2G40 operating manual! (Annex)



9.07 Changing the fuel filter

Note:

When working on the fuel system, no naked flames, no smoking.

- The diesel line filter „DF“ must be drained of water at least once a year or every 200 hours (Fig. 31).
- To drain off the filter, the handwheel must be opened, until surplus water runs away and pure diesel fuel emerges.
- After draining, close the hand wheel and check the filter for leaks.

Changing the fuel filter

- Release both fillister-head screws at the filter holder and remove the fuel filter „DF“ (Fig. 31).
- Detach the fuel hoses and insert new fuel filter „DF“. Replace any fuel hoses that are porous or leaking.
- Mount the fuel filter „DF“ in reverse order and check for leaks.
- The fuel system is self-priming.



Note:

Collect any emerging fuel and dispose of in an environmentally responsible manner together with the fuel filter!

9.08 Battery

⚠ Danger

When working with the battery, no naked flame, no smoking! Do not allow acid to come into contact with clothes or skin!

Wear protective goggles! Do not lay any tools on the battery!

The battery is located under the hood (Fig. 32). It is very important to keep the battery clean and to carry out maintenance correctly in order to have a perfect function of this battery. If the machine is out of action for a longer period of time the battery must be disconnected in order to prevent a deep discharge. Especially the terminals and clamps must be cleaned regularly and afterwards be coated thickly with an acidproof grease.

Note:

Dispose of old batteries correctly.



9.09 Changing the transmission oil

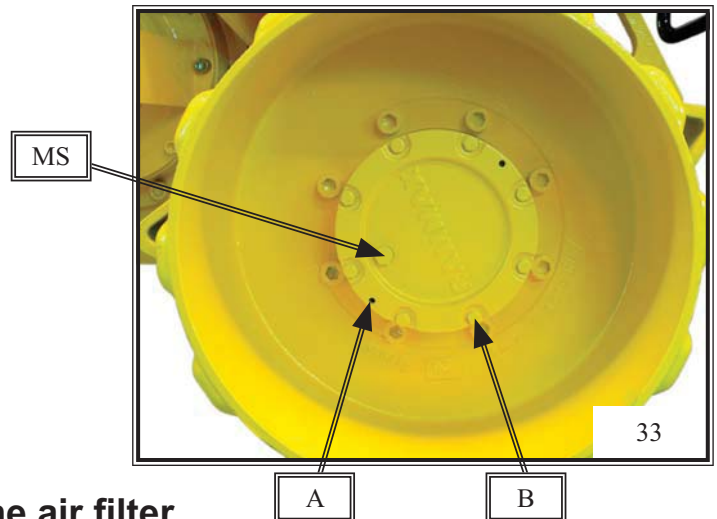
- Unscrew magnetic plug „M“ and clean. (Fig. 33)
- Release the fastening screws „B“ on the transmission cover.
- Screw puller bolts into thread „A“ (M8x25 DIN 933-8.8) and pull off the transmission cover.

Transmission oil: Titan Gear MP 80

Note:

Collect the transmission oil in a suitable container and dispose of in an environmentally responsible manner

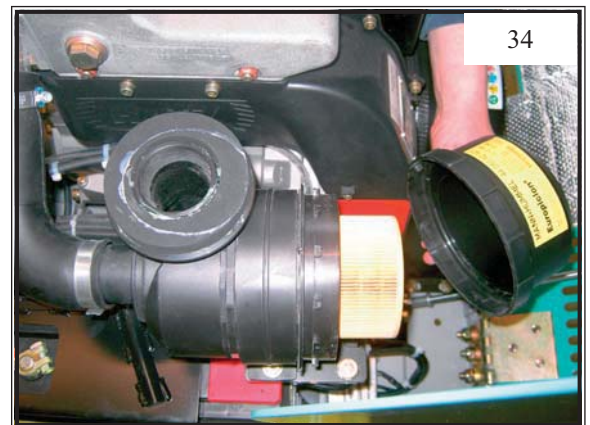
- Wash out the drive system and remount the transmission cover (the gasket on the transmission cover must not be damaged).
- Top up transmission oil through the magnetic plug opening (1.1 litres) and screw the cleaned magnetic plug back in.
- Check the drive system for leaks.



9.10 Checking / cleaning / replacing the air filter

Replace air filter cartridge:

- Release the sealing cap „D“ from the air filter housing and remove air filter cartridge „P“.
- After inserting the cleaned or new filter cartridge, mount the sealing cover „D“.



Note:

Never use petrol or hot fluid to clean the filter cartridge!!!

After cleaning, the filter cartridge must be examined for damage using a lamp. Filter cartridges which are damaged at the seal or at the cartridge itself must be exchanged without fail. The filter cartridge of the air filter must be exchanged after being cleaned three times or after a year at the latest. If the filter cartridge is contaminated with sooty deposits, cleaning is not possible. Use a new cartridge. Each completed cleaning process of the filter cartridge must be documented on the lid of the cartridge. Insufficient cleaning and handling of the filter cartridge can lead to serious damage to the engine!!!

Dry cleaning:

⚠ Danger to the eyes!

Wear protective clothing (protective goggles, gloves)

- Blow through the filter cartridge using dry compressed air (max. 5 bar) from the inside to the outside.

Wet cleaning:

Clean the filter cartridge by waving backwards and forwards in lukewarm water using a standard commercially available mild detergent. Then rinse well in cold water, shake out and leave to dry well.

9.11 Changing the engine oil

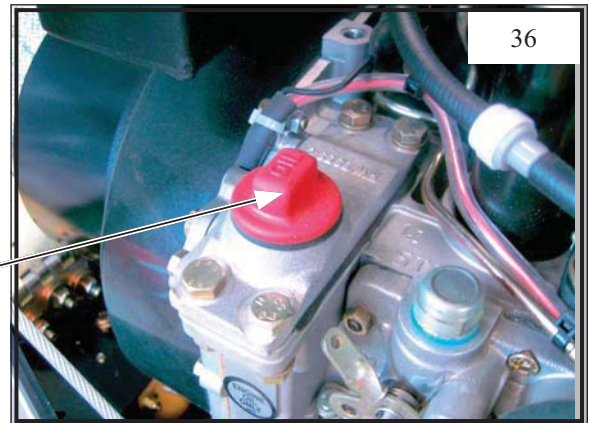
Remark:

Drain the engine oil only when the engine is warm. Change intervals for engine oil, see the Hatz 2G40 Manual (Annex).

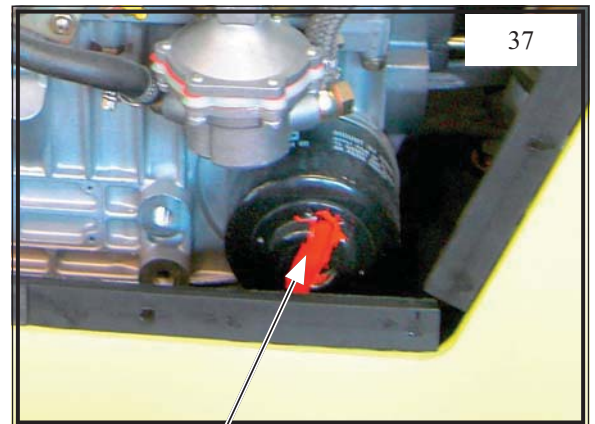
⚠ Danger

Danger of scalding!

Risk of scalding when draining hot engine oil!



- Disconnect oil drainage hose „S“ and remove plug „M“ (Fig. 35).
- Collect the oil in a suitable container and dispose of in an environmentally responsible manner.
- Oil filter change (Fig. 37)
- Connect the oil drain hose and top up with new oil at the filling hole „E“ (Fig. 36).



ÖF

9.12 Hydraulic oil change

⚠ Danger

Danger of scalding!

Risk of scalding when draining hot hydraulic oil!

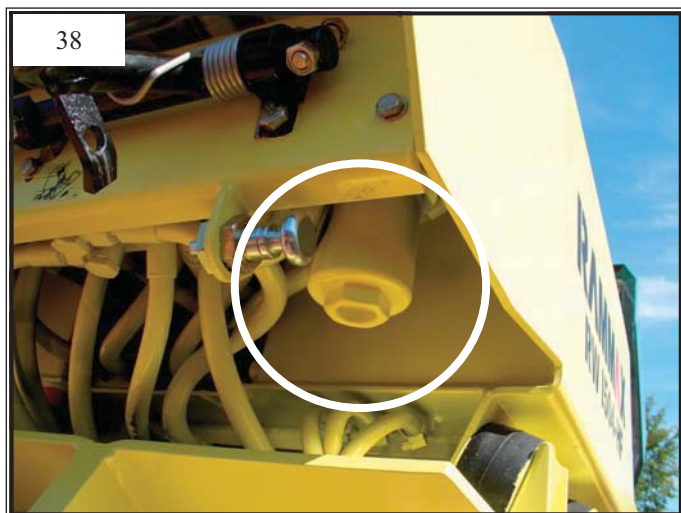
9.12.1 Hydraulic system

Maintenance work on the hydraulic system is essentially limited to the filter and hydraulic oil tank. All other units require no maintenance. The hydraulic line network should, however, be checked at regular intervals for leaks. Do not spray hydraulic lines with paint.

9.12.2 Hydraulic oil change

Clean the area surrounding the pressure line filter. ⇒ Remove the pressure line filter (Fig. 38) and clean. For complete tank drainage, lift the roller at the front transport eye bolt " O " (Fig. 38) using a crane. When the oil tank has been completely drained, screw the oil plug "S" back in with a new seal. Fill the tank with oil. Start the engine and allow to run until the hydraulic oil has distributed around the line system. Switch off the engine. Top up the tank again if necessary. Fill the oil level up to the middle of the sight glass. Tank capacity approx. 47 l

Recommended oil types : Mobil HLP 46, Texaco Rando HD-C.
Equivalent oil types from other manufacturers can also be used.



Note:

Never start the engine with the hydraulic oil drained. Never allow the pumps to run without oil!

9.13 High-pressure line filter

Clean the area surrounding the high-pressure line filter. Remove the filter cartridge from the high-pressure line filter (Fig. 38) and replace.

Remark:

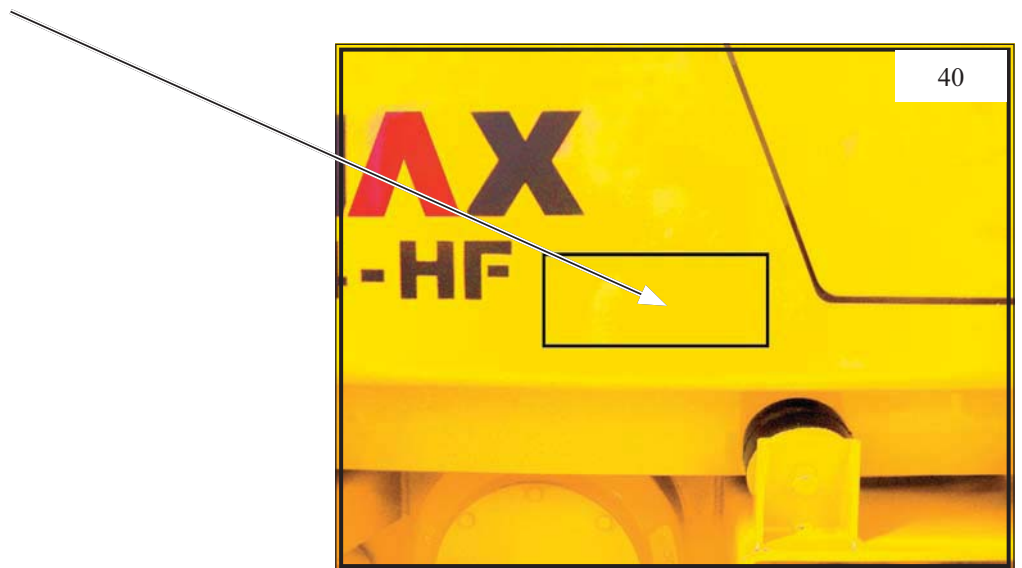
Work on hydraulic systems may only ever be performed by specially qualified staff with the relevant knowledge and experience in hydraulics. Drain oil into a suitable container and dispose of in an environmentally responsible manner together with the filter cartridge.

Recommendation:

Where major repairs have to be carried out on the hydraulic pipeline network, the hydraulic oil should also be changed.

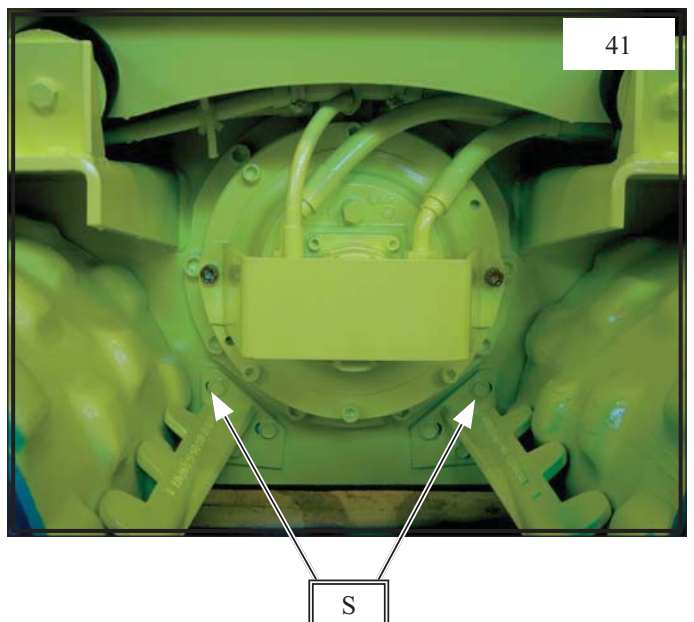
9.14 Changing the suction filter

The suction filter „S“ must be changed after every hydraulic oil change and every 1000 operating hours.



9.15 Adjusting the stripper

- Loosen all three bolts „S“ and push the stripper towards the drum.
- The distance between the stripper and the drum must be at least 2 mm.
- Tighten bolts „S“ again. (Fig. 41)



Remark:

In case of stripper wear (two strippers each per drum) these must be readjusted or replaced.

10.0 Tightening torques for bolts with standard metric thread

Bolt size	Tightening torques Nm		
	8.8	10.9	12.9
M 4	3	5	5
M 5	6	9	10
M 6	10	15	18
M 8	25	35	45
M10	50	75	83
M12	88	123	147
M14	137	196	235
M16	211	300	358
M18	290	412	490
M20	412	578	696
M22	560	785	942
M24	711	1000	1200
M27	1050	1480	1774
M30	1420	2010	2400

Bolt size	Tightening torques ft-lb		
	8.8	10.9	12.9
M 4	2	3	4
M 5	4	7	7
M 6	7	11	13
M 8	18	26	33
M10	37	55	61
M12	65	91	108
M14	101	145	173
M16	156	221	264
M18	213	303	361
M20	304	426	513
M22	413	559	695
M24	524	798	885
M27	774	1092	1308
M30	1047	1482	1770

Strength classes for bolts with untreated, unlubricated surface. The bolt quality designation is indicated on the bolt heads.

8.8 = 8G; 10.9 = 10K; 12.9 = 12K

The values represent 90% utilisation of the bolt yield strength with a coefficient of friction of $\mu_{ges.} = 0.14$. Adherence to the tightening torque levels is checked using a torque wrench.

The specified tightening torques do not apply if MoSo₂ lubricant is used.

11.0 Troubleshooting table

Fault:	Possible cause:	Remedy:
Engine running, machine does not move!	Insufficient hydraulic oil in the tank.	<ul style="list-style-type: none"> • Check hydraulic oil level • Check the hydraulic system for leaks
Engine running, machine can only be driven forwards!	Safety bar in engaged position	<ul style="list-style-type: none"> • Pull safety bar out of engaged position. • Only engage safety bar during transport, not in the work mode

OPERATION MANUAL

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL
NUMBER *ON-HAND* WHEN CALLING

UNITED STATES

Multiquip Corporate Office

18910 Wilmington Ave. Tel. (800) 421-1244
Carson, CA 90746 Fax (800) 537-3927
Contact: mq@multiquip.com

Mayco Parts

800-306-2926 Fax: 800-672-7877
310-537-3700 Fax: 310-637-3284

Service Department

800-421-1244 Fax: 310-537-4259
310-537-3700

MQ Parts Department

800-427-1244 Fax: 800-672-7877
310-537-3700 Fax: 310-637-3284

Warranty Department

800-421-1244, Ext. 279 Fax: 310-537-1173
310-537-3700, Ext. 279

Technical Assistance

800-478-1244 Fax: 310-631-5032

MEXICO

MQ Cipsa

Carr. Fed. Mexico-Puebla KM 126.5 Tel: (52) 222-225-9900
Momoxpan, Cholula, Puebla 72760 Mexico Fax: (52) 222-285-0420
Contact: pmastretta@cipsa.com.mx

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